A New Atherinid Fish of the Genus *Iso* from the Hawaiian Islands[1]

WILLIAM A. GOSLINE[2]

TWO SPECIES OF ATHERINID FISHES are known from the Hawaiian Islands. One is the iao (*Pranesus insularum*[3]) used as bait by the tuna fishermen and known to occur in numbers at least from Oahu through the leeward Hawaiian Islands to Midway. The other species (*Iso hawaiiensis*) is here described.

The two Hawaiian atherinids may be distinguished readily, for *Iso* has a deep, sharply edged abdomen (Fig. 1*b*) which will separate it from not only the iao, but also from any of the other small silvery fishes in the region.

Iso hawaiiensis new species
Fig. 1*a*, *b*

HOLOTYPE: U. S. National Museum No. 152759, 28 mm. in standard length, taken in a poison station October 3, 1950, by Gosline and class over sand off a rocky point ½ mile west of Makapuu Point, Oahu, Territory of Hawaii. This is normally an area of heavy surf.

PARATYPES: University of Hawaii No. 957, two specimens 20.0 mm. and 18.5 mm. in standard length, taken with the holotype.

Body very compressed, maximum width at shoulder contained 7.1 to 7.4 times in standard length. Breast forming keel, sharp-edged in cross section (Fig. 1*b*), convex in longitudinal outline. Dorsal profile gently and more or less evenly convex from above eye to second dorsal origin. Snout bluntly rounded. Body tapering between second dorsal and anal. Body depth 3.4–3.7, head length 3.6–4.3 in standard length.

Eye diameter 2.1–2.7 in head, somewhat greater (in these small specimens) than snout or interorbital width. Mouth very oblique, forming angle of about 60 degrees with horizontal axis. Premaxillaries not protractile, attached to head by frenum on the middorsal line, not expanded posteriorly, and not bound down to mandibles by a membrane between the jaws. Maxillaries toothless, slightly concave in front. Lower jaw deep and bluntly rounded, slightly included within upper when the mouth is closed. [I am unable to discover any teeth even in the largest of these three small specimens.] Lips covered with series of soft, tooth-shaped papillae. Membranes stretched across mouth on inside of each jaw, lower membrane larger. Gill openings wide, membranes free. Gill rakers long, about 12 in number (counted in the holotype only and without extracting). Cleft behind first gill arch wide, behind second moderate, behind third restricted, and behind fourth absent. Branchiostegal rays 5–5 in holotype.

Dorsals IV or V, I 16. First dorsal originates very slightly anterior to point midway between pelvic and anal origins, its spines all very slender and of approximately equal length. Second dorsal originates about twice as far from caudal base as from tip of snout, above base of eighth anal ray. Spine of second dorsal about 0.5 the length of the first soft ray, preceded by fleshy projection from back. Dorsal and anal highest forward, tapering sharply to middle of fin, more gradually

[1]Contribution No. 15, Hawaii Marine Laboratory.
[2]Department of Zoology and Entomology, University of Hawaii. Manuscript received October 23, 1950.
[3]For the generic allocation of this species see Schultz, 1948: 23.

thereafter. Pectorals short and rounded, origin of uppermost ray above most posterior point on opercle, nearer dorsal outline than to upper edge of silvery lateral band.

Distance from snout to ventrals contained about 1.6 times in ventral–caudal distance. Vent near but not quite at the origin of the anal, preceded on the ventral midline by about four pairs of body scales.

Scales cycloid, ovoid on sides, absent from head and front of body. About 38 scales or scale pockets in a longitudinal series on the holotype; scales lacking on paratypes.

Color in alcohol whitish except for silvery eye, cheek, occipital region, and lateral band. Lateral band broadest about under origin of second dorsal, slightly less than an eye diameter in width (in these small specimens). Silvery lateral band disappears about midway along caudal peduncle, reappearing again as a rather indefinite, irregular silvery spot just before caudal base. In life this fish is brilliantly silvery. [It is my impression that the silvery reflections came from the whole fish and not merely from the regions that retain the silver coloration in alcohol.]

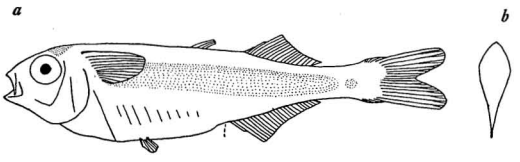

FIG. 1. Holotype of *Iso hawaiiensis*. *a*, Lateral aspect; *b*, cross section through the deepest part of body.

TABLE 1

MEASUREMENTS* AND COUNTS ON *Iso hawaiiensis*

CHARACTER	HOLOTYPE	PARATYPES	
Total length	34.2 mm.	24.0 mm.	22.5 mm.
Standard length	28.0 mm.	20.0 mm.	18.5 mm.
Snout to first dorsal	538	490	508
Snout to second dorsal	693	661	703
Length of first dorsal base	54	60	59
Between dorsals	143	110	97
Length of second dorsal base	193	235	249
Snout to ventrals	438	415	379
Snout to anus	636	570	535
Anus to anal	36	45	49
Length of anal base	239	275	276
Length of caudal peduncle	175	160	168
Depth of caudal peduncle	86	90	97
Depth of body	293	295	270
Width of body	136	140	141
Head length	275	235	243
Upper jaw length	104	110	114
Snout length	93	80	86
Eye diameter	100	105	114
Width of interorbital	86	90	103
Length of first dorsal spine	82	75	81
Length of longest anal ray	118	105	108
Length of pectoral	168	165	178
Length of ventral	121	115	108
Greatest width of silvery band	79	85	76
Number of pectoral rays	13	12	13
Number of caudal rays	I-15-I	I-15-I	I-15-I
Number of first dorsal spines	IV	V	V
Number of second dorsal rays	I, 16	I, 16	I, 16
Number of anal rays	I, 22	I, 20	I, 24

* All measurements, except standard and total length, given in thousandths of the standard length.

Iso hawaiiensis belongs to the small and aberrant atherine subfamily Notocheirinae (Schultz, 1950: 150). Schultz (1948: 5) divides this subfamily into three genera. Of these *Notocheirus*, based on two specimens from Chile, is certainly distinct. However, Schultz's other two genera—*Iso* and *Tropidostethops*—are so closely related that I can find no morphological or philosophical grounds for separating them. The only distinguishing character Schultz (1948) gives is the configuration of the silvery lateral band quoted in section 1 of the key given below. This difference hardly seems of generic value; if other more significant differences exist, they are not stated in the literature. Furthermore, Jordan and Hubbs, in an earlier revision of the Atherinidae (1919: 47), have compared the genotypes of *Iso* and *Tropidostethops* and consider them to be congeneric. This is particularly significant as Jordan and Hubbs split the atherine genera rather finely (they divide 149 species and subspecies between 38 genera, giving an average of 3.9 species and subspecies per genus). Smith (1949: 324), writing subsequently to Schultz, also fails (by inference) to recognize these two genera.

If both genera are recognized, *Iso* becomes monotypic, and *Tropidostethops* would contain four known species. Even the geographic distribution of such genera would not be significant. *Iso* would be limited to Japan, whereas *Tropidostethops* would have representatives in southern Africa, India, Australia, and now Hawaii.

Finally, Schultz's fine discrimination between these two atherinid genera is not consistent with his own broad interpretation of genera in certain other groups, e.g., in eels (Schultz and Woods, 1949).

For the above reasons I consider *Tropidostethops*, to which *Iso hawaiiensis* would be assigned if *Tropidostethops* were considered valid, a synonym of *Iso*.

In view of the addition of *Iso hawaiiensis* and of the redescription of *Iso natalensis* by Smith (1935: 178, pl. 19, fig. c), Herre's (1944: 47) key to the species of this genus stands in need of revision. It may be rewritten as follows:

1. "Silvery lateral band continuous and not interrupted. (Japan)"[4] ..... *Iso flos-maris*
   "Silvery lateral band fading and interrupted or narrowly constricted on caudal peduncle, then continuing and expanding, ending in a prominent silvery area"[4] 2
2. Maxillary with external teeth. Scales in a longitudinal series 40–44. (India) ..... *Iso flos-indicus*
   Maxillary without external teeth 3
3. Scales in a longitudinal series about 38; teeth apparently absent. (Hawaii) ..... *Iso hawaiiensis*
   Scales in a longitudinal series more than 45; teeth present 4
4. Depth 3.5–4.0 in standard length; scales in a longitudinal series about 49. (Australia) ..... *Iso rhothophilus*
   Depth 3.2–3.4 in standard length; scales in a longitudinal series about 74. (South Africa) ..... *Iso natalensis*

With the addition of *Notocheirus hubbsi* to the above species, the distribution of the Notocheirinae—South Africa, India, Australia, Hawaii, and Chile—becomes unique, so far as I am aware, among fish groups.

REFERENCES

HERRE, A. W. 1944. Notes on fishes in the zoological museum of Stanford University. XVII. New fishes from Johore and India. *Biol. Soc. Wash., Proc.* 57: 45–52.

JORDAN, D. S., and C. L. HUBBS. 1919. *A monographic review of the family of Atherinidae or silversides.* Stanford Univ., Pubs., Univ. Ser., Biol. Sci. 87 pp., 12 pls.

SCHULTZ, L. P. 1948. A revision of six subfamilies of atherine fishes, with descriptions of new genera and species. *U. S.*

[4]Quoted from Schultz (1948: 6).

Natl. Mus., Proc. 98: 1–48, 2 pls., 9 figs.

——— 1950. Correction for "A revision of six subfamilies of atherine fishes, with descriptions of new genera and species." *Copeia* 1950: 150.

——— and L. P. WOODS. 1949. Keys to the genera of echelid eels and the species of *Muraenichthys* of the Pacific, with two new species. *Wash. Acad. Sci., Jour.* 39: 169–174, 2 figs.

SMITH, J. L. B. 1935. New and little known fishes from South Africa. *Albany Mus., Rec.* 4 (2): 169–235, 6 pls., 5 figs.

——— 1949. *The sea fishes of southern Africa.* 550 pp., 103 col. pls., text figs. Central News Agency, Cape Town.